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PATENT APPLICATION

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IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Mark R. STEVENS, et al. **Confirmation No.:** 7937

Application No.: 09/987,918 **Examiner:** Larose, C. M.

Filing Date: 11/16/01 **Group Art Unit:** 2623

Title: HISTOGRAM-BASED COLOR CONSISTENCY MEASURE FOR SCENE RECONSTRUCTION

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TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on **08/08/05**.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) $500.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

( ) (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d) for the total number of months checked below:

( )	one month	$120.00
( )	two months	$450.00
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( ) The extension fee has already been filled in this application.

(X) (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

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Respectfully submitted,

Mark R. STEVENS, et al.

By ______________________

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Rev 12/04 (Aplbrief)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant:	Stevens et al.	Patent Application	
Application No.:	09/987,918	Group Art Unit:	2623
Filed:	November 16, 2001	Examiner:	Larose, Colin M.

For: HISTOGRAM-BASED COLOR CONSISTENCY MEASURE FOR SCENE RECONSTRUCTION

APPEAL BRIEF

Table of Contents

I. Real Party in Interest

The assignee of the present invention is Hewlett-Packard Development Company, L.P.

II. Related Appeals and Interferences

There are no related appeals or interferences known to the Appellants.

III. Status of Claims

Claims 1-11, 14, 15, 17 and 19 are rejected. Claims 12, 13, 16, 18 and 20 are objected as being dependent upon rejected base claims, but would be allowable if rewritten in independent form including all of the limitations of the related base claim and any intervening claims. This appeal involves Claims 1-11, 14, 15, 17 and 19.

IV. Status of Amendments

An amendment has not been filed subsequent to the final rejection.

V. Summary of Claimed Subject Matter

Independent Claims 1 and 19 of the present application pertain to embodiments associated with a method of measuring color consistency between different images of an object. Specifically, the claimed embodiments are for testing the color consistency of partitions of different two-dimensional images of the same object. Image partitions are selected based upon a criteria related to a three-dimensional region of the object. Thus the invention as claimed provides for testing color consistency of different images of the same object for use in three-dimensional modeling of the object.

As recited in Claims 1-11, 14, 15 and 17, a method of measuring color consistency is described. This method is depicted in Figure 3. As shown at step 200, a first two-dimensional image and a second two-dimensional image of an object are obtained (page 14, lines 2-4). In one embodiment, the images obtained are images of a scene 30 of the object (page 11, lines 29-30). At step 210, the first image is subdivided into a first set of image partitions and the second image is subdivided into a second set of image partitions, each image partition having a color (page 14, lines 5-8). In one embodiment, the images are subdivided into sets of pixels (page 14, lines 7-8). At step 220, a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions are selected based upon a criteria related to a three-dimensional region of the object (page 14, lines 9-14). In one embodiment, the subsets of are selected based upon a criteria related to a voxel region of the object (page 2, lines 6-10; page 7, lines 4-10). In another embodiment, the subsets of are selected based whether the subsets represent locations in the region (page 7, lines 4-10).

At step 230, each image partition in the first subset and each image partition in the second subset is assigned a color value corresponding to the color of the image partition (page 14, lines 15-18). In various embodiments, the partitions are assigned color values corresponding to at least one of an array value, a three-dimensional array value, RGB color values, a number ranging from 0 to 255 for each of the RGB color values, and combined agglomerated values (page 7, lines 23-27; page 8, line 33 through page 9, line 14). At step 240, each image partition in the first subset is placed in one of a first series of histogram subdivisions and each image partition in the second subset is placed in one of a second series of histogram subdivisions based on the color value of each image partition (page 14, lines 19-25). In one embodiment, the histogram subdivisions are combined into histogram partitions

(page 14, lines 23-25). At step 260, the first series of histogram subdivisions is compared to the second series of histogram subdivisions (page 14, lines 30-31). In one embodiment, the comparing includes comparing corresponding sets of histogram subdivisions to see if each subdivision contains an image partition (page 14, lines 30-31). At shown at step 270, the region is processed based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity (page 14, line 31 through page 15, line 2).

As recited in Claim 19, a computer program product including a computer-readable medium containing instruction for controlling a computer system to perform a method of measuring color consistency is described. This method is depicted in Figure 3. As shown at step 200, a first two-dimensional image and a second two-dimensional image of an object are obtained (page 14, lines 2-4). At step 210, the first image is subdivided into a first set of image partitions and the second image is subdivided into a second set of image partitions, each image partition having a color (page 14, lines 5-8). At step 220, a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions are selected based upon a criteria related to a three-dimensional region of the object (page 14, lines 9-14). At step 240, each image partition in the first subset is placed in one of a first series of histogram subdivisions and each image partition in the second subset is placed in one of a second series of histogram subdivisions based on the color value of each image partition (page 14, lines 19-25). At step 260, the first series of histogram subdivisions is compared to the second series of histogram subdivisions (page 14, lines 30-31). As shown at step 280, the region is included in a three-dimensional model of the object if the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity (page 15, lines 6-9).

VI. Grounds of Rejection to Be Reviewed on Appeal

Claims 1-3, 5-11 and 19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over United States Patent 6,721,449 by Krishnamachari, hereinafter referred to as the "Krishnamachari" reference, in view of "Image Retrieval with Local and Spatial Queries" by Moghaddam et al., hereinafter referred to as the "Moghaddam" reference.

Claim 4 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Krishnamachari in view of Moghaddam, further in view of United States Patent 4,985,856 by Kaufman et al., hereinafter referred to as the "Kaufman" reference. Claim 4 is dependent on independent Claim 1.

Claim 14 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Krishnamachari in view of Moghaddam, further in view of "Color Indexing" by Swain et al., hereinafter referred to as the "Swain" reference. Claim 14 is dependent on independent Claim 1.

Claim 15 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Krishnamachari in view of Moghaddam, further in view of United States Patent 6,691,126 by Syeda-Mahmood, hereinafter referred to as the "Syeda-Mahmood" reference. Claim 15 is dependent on independent Claim 1.

Claim 17 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Krishnamachari in view of Moghaddam, further in view of United States Patent 6,711,288 by Kim et al., hereinafter referred to as the "Kim" reference. Claim 17 is dependent on independent Claim 1.

VII. Argument

A. Claims 1-3, 5-11 and 19

Claims 1-3, 5-11 and 19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over United States Patent 6,721,449 by Krishnamachari in view of Moghaddam. Appellants respectfully assert that the combination of Krishnamachari and Moghaddam does not teach, describe or suggest the embodiments of the present invention recited in independent Claims 1 and 19. For instance, Krishnamachari and the present invention are very different. Appellants understand Krishnamachari to teach a method for determining a degree of similarity between a target image and a plurality of reference images. In particular, Krishnamachari teaches a method for graphics based retrieval of images stored in a database.

Appellants respectfully assert that Krishnamachari does not teach, describe or suggest a method of measuring color consistency including "obtaining a first two-dimensional image and a second two-dimensional image of an object," as claimed. Rather, Krishnamachari teaches a method for comparing a plurality of reference images to a target image for the purpose of identifying reference images that are similar to the target image. With reference to Figure 1 of Krishnamachari, a user provides a target image 101 to the system. The system then provides a list 171 of images 111 in the database 110 that are most similar to target image 101 (col. 3, lines 28-32). In particular, Krishnamachari does not teach, describe or suggest that target image 101 and any of the images 111 are of the same object.

Krishnamachari describes examples where the database includes portraits in a museum, works of an artist, or images of automobiles (col. 3, lines 21-26). However, these examples do not teach that the images 111 are the same as the target image 101. For

example, portraits of mountains may be similar, but not of the same mountain. Similarly, works of an artist may be an original work or a print of the work. Furthermore, an image of an automobile may be one of however many of that type of automobile was manufactured, which may number in the hundreds of thousands.

In contrast, the present invention provides a method of measuring color consistency including "obtaining a first two-dimensional image and a second two-dimensional image <u>of an object</u>," as claimed. As described in the specification, two images of the same object are obtained (page 5, lines 7-8; page 11, lines 27-34; page 14, lines 2-4). Specifically, the present invention is useful for testing the color consistency of two sets of pixels of the same object. If the color is consistent, the consistent sets of pixels can be used in three-dimensional modeling of the object. Specifically, images of different objects are not useful for three-dimensional modeling of the same three-dimensional model. By teaching providing a list of images similar to a target image, Krishnamachari <u>teaches away from</u> using images of the same object, as claimed.

Furthermore, Appellants respectfully assert that Krishnamachari does not teach, describe or suggest a method of measuring color consistency including "<u>processing</u> the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity," as claimed. With reference to Figure 3 of Krishnamachari, a characteristics comparator 160 is shown. The image characteristics (color consistency) are compared in total, to determine image similarity measures 161. The image similarity measures 161, and identifiers of the associated reference images, are provided to sorter 170 of Figure 1 for displaying a list of images most similar to the target image (col. 5, line 35 through col. 6, line 29). In particular, Krishnamachari does not teach, describe or

suggest that the target image or any selected reference image is processed in any way. Moreover, with regard to independent Claim 19, Krishnamachari does not teach, describe or suggest "including the region in a three-dimensional model of the object if the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity," as claimed. In particular, Appellants respectfully assert that displaying an identifier and an associated similarity measure does not teach, describe or suggest "processing the region" as claimed.

In contrast, the present invention provides a method of measuring color consistency including "processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity," as claimed. As described in the specification, the three-dimensional region of the object is processed depending on the color consistency of the region. Specifically, the region can be added to a three-dimensional model (page 15, lines 7-8). In particular, the determination of whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity allows for determining whether the region can be included in a three-dimensional model. The claimed method allows for improved selection of regions of two-dimensional images for use in modeling a three-dimensional model (page 6, line 25 through page 7, line 4; page 12, lines 1-15). By teaching that the target image and selected reference images are not processed, Krishnamachari teaches away from processing the region based on whether the histograms have a similarity, as claimed.

Furthermore, Appellants respectfully assert that one skilled in the art would not be motivated to modify Krishnamachari to provide the invention as claimed. As described above, Krishnamachari teaches a method for graphics based retrieval of images stored in a

database. In order to provide useful results to a user, each entire image is analyzed so that a similarity measure is provided. This similarity measure is based on the number of occurrences of similar colors in each image, and weighted by the degree of similarity of the colors (col. 6, lines 4-18). In contrast, the present invention is used for determining color consistency of regions of images of the same object for use in three-dimensional modeling. Specifically, it is known that the images are of the same object. In essence, Krishnamachari teaches a method for finding similar images, while the invention as claimed provides a method for measuring color consistency of partitions of different images of the same object. As such, Appellants respectfully submit that Krishnamachari teaches away from such a configuration, and that one skilled in the art would not be motivated to modify Krishnamachari to provide the claimed invention.

Moreover, the combination of Krishnamachari and Moghaddam fails to teach or suggest the claimed embodiments because Moghaddam does not overcome the shortcomings of Krishnamachari. Moghaddam, either alone or in combination with Krishnamachari, does not show or suggest the invention as claimed. Appellants understand Moghaddam to teach a similar image retrieval system as taught in Krishnamachari.

Appellants respectfully assert that Moghaddam does not teach, describe or suggest a method of measuring color consistency including "obtaining a first two-dimensional image and a second two-dimensional image of an object," as claimed. Furthermore, Appellants respectfully assert that Moghaddam does not teach, describe or suggest a method of measuring color consistency including "processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity," as claimed. As described above, an image retrieval system teaches away from the

invention as claimed. In essence, Moghaddam teaches image retrieval based on a region-of-interest of an image. However, Moghaddam teaches that the region-of-interest is used to find similar images. By teaching a system for retrieving similar images based on overall similarity of the region-of-interest, Moghaddam teaches away from the invention as claimed.

Furthermore, Moghaddam was cited as teaching the claimed limitation of "selecting a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions based upon a criteria related to a three-dimensional region of the object." Appellants respectfully assert that Moghaddam does not teach, describe or suggest such a limitation. In particular, Moghaddam does not teach, describe or suggest the use of any three-dimensional information. In contrast, Moghaddam teaches the use of spatial information. Appellants understand "spatial information" to describe the relative spacing of regions-of-interest, and that spatial information is not related to three-dimensional characteristics of these regions. In particular, Appellants respectfully assert that spatial information is based on two-dimensional characteristics. With reference to Figure 4 of Moghaddam, three regions are shown, as well as relationships corresponding to their spatial configuration. Moreover, as described in Section 4 of Moghaddam, the calculation of spatial configurations is based on a two-dimensional calculation (e.g., "2D strings" proposed for iconic indexing by Chang). By teaching a system for retrieving similar images based on spatial configuration, and therefore two-dimensional information, Moghaddam teaches away from the invention as claimed.

Appellants respectfully assert that nowhere does the combination of Krishnamachari and Moghaddam teach, disclose or suggest the present invention as recited in independent Claims 1 and 19, and that Claims 1 and 19 are thus in condition for allowance. Therefore,

Appellants respectfully submit that the combination of Krishnamachari and Moghaddam also does not teach or suggest the additional claimed features of the present invention as recited in Claims 2, 3 and 5-11 that are dependent on allowable base Claim 1. Appellants respectfully submit that Claims 2, 3 and 5-11 overcome the rejection under 35 U.S.C. § 103(a) as these claims are dependent on an allowable base claim.

B. Claim 4

Claim 4 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Krishnamachari in view of Moghaddam, further in view of Kaufman. Claim 4 is dependent on independent Claim 1.

Appellants respectfully assert that neither Krishnamachari, Moghaddam or Kaufman teach, describe or suggest the embodiments of the present invention recited in Claim 1. As described above, neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including "obtaining a first two-dimensional image and a second two-dimensional image of <u>an object</u>," as claimed. Furthermore, Appellants respectfully assert that neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including "<u>processing</u> the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity," as claimed. Moreover, neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including "selecting a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions <u>based upon a criteria related to a three-dimensional region of the object</u>," as claimed. As described above, Krishnamachari and Moghaddam teach image retrieval systems.

Moreover, the <u>combination</u> of Krishnamachari, Moghaddam and Kaufman fails to teach or suggest the claimed embodiments because Kaufman does not overcome the shortcomings of Krishnamachari and or Moghaddam. Appellants understand Kaufman to teach a method and apparatus for storing, accessing and processing voxel-based data. Kaufman, either alone or in combination with Krishnamachari and/or Moghaddam, does not show or suggest a method of measuring color consistency including "obtaining a first two-dimensional image and a second two-dimensional image of an object," "processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity," or "selecting a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions <u>based upon a criteria related to a three-dimensional region of the object</u>," as claimed.

Appellants respectfully assert that nowhere does the combination of Krishnamachari, Moghaddam and Kaufman teach, disclose or suggest the present invention as recited in independent Claim 1, and that Claim 1 is thus in condition for allowance. Therefore, Appellants respectfully submit that the combination of Krishnamachari, Moghaddam and Kaufman also does not teach or suggest the additional claimed features of the present invention as recited in Claim 4 that is dependent on allowable base Claim 1. Appellants respectfully submit that Claim 4 overcomes the rejection under 35 U.S.C. § 103(a) as this claim is dependent on an allowable base claim.

<u>C. Claim 14</u>

Claim 14 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Krishnamachari in view of Moghaddam, further in view of Swain. Claim 14 is dependent on independent Claim 1.

Appellants respectfully assert that neither Krishnamachari, Moghaddam or Swain teach, describe or suggest the embodiments of the present invention recited in Claim 1. As described above, neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including "obtaining a first two-dimensional image and a second two-dimensional image of an object," as claimed. Furthermore, Appellants respectfully assert that neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including "processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity," as claimed. Moreover, neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including "selecting a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions based upon a criteria related to a three-dimensional region of the object," as claimed. As described above, Krishnamachari and Moghaddam teach image retrieval systems.

Moreover, the combination of Krishnamachari, Moghaddam and Swain fails to teach or suggest the claimed embodiments because Swain does not overcome the shortcomings of Krishnamachari and or Moghaddam. Appellants understand Swain to teach the use of color histograms for computer visioning. Swain, either alone or in combination with Krishnamachari and/or Moghaddam, does not show or suggest a method of measuring color consistency including "obtaining a first two-dimensional image and a second two-

dimensional image of an object," "processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity," or "selecting a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions based upon a criteria related to a three-dimensional region of the object," as claimed.

Appellants respectfully assert that nowhere does the combination of Krishnamachari, Moghaddam and Swain teach, disclose or suggest the present invention as recited in independent Claim 1, and that Claim 1 is thus in condition for allowance. Therefore, Appellants respectfully submit that the combination of Krishnamachari, Moghaddam and Swain also does not teach or suggest the additional claimed features of the present invention as recited in Claim 14 that is dependent on allowable base Claim 1. Appellants respectfully submit that Claim 14 overcomes the rejection under 35 U.S.C. § 103(a) as this claim is dependent on an allowable base claim.

D. Claim 15

Claim 15 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Krishnamachari in view of Moghaddam, further in view of Syeda-Mahmood. Claim 15 is dependent on independent Claim 1.

Appellants respectfully assert that neither Krishnamachari, Moghaddam or Syeda-Mahmood teach, describe or suggest the embodiments of the present invention recited in Claim 1. As described above, neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including "obtaining a first two-dimensional image and a second two-dimensional image of an object," as claimed.

Furthermore, Appellants respectfully assert that neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including "processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity," as claimed. Moreover, neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including "selecting a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions based upon a criteria related to a three-dimensional region of the object," as claimed. As described above, Krishnamachari and Moghaddam teach image retrieval systems.

Moreover, the combination of Krishnamachari, Moghaddam and Syeda-Mahmood fails to teach or suggest the claimed embodiments because Syeda-Mahmood does not overcome the shortcomings of Krishnamachari and or Moghaddam. Appellants understand Syeda-Mahmood to teach a method and apparatus for locating multi-region objects in an image. Syeda-Mahmood, either alone or in combination with Krishnamachari and/or Moghaddam, does not show or suggest a method of measuring color consistency including "obtaining a first two-dimensional image and a second two-dimensional image of an object," "processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity," or "selecting a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions based upon a criteria related to a three-dimensional region of the object," as claimed.

Appellants respectfully assert that nowhere does the combination of Krishnamachari, Moghaddam and Syeda-Mahmood teach, disclose or suggest the present invention as recited

in independent Claim 1, and that Claim 1 is thus in condition for allowance. Therefore, Appellants respectfully submit that the combination of Krishnamachari, Moghaddam and Syeda-Mahmood also does not teach or suggest the additional claimed features of the present invention as recited in Claim 15 that is dependent on allowable base Claim 1. Appellants respectfully submit that Claim 15 overcomes the rejection under 35 U.S.C. § 103(a) as this claim is dependent on an allowable base claim.

E. Claim 17

Claim 17 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Krishnamachari in view of Moghaddam, further in view Kim. Claim 17 is dependent on independent Claim 1.

Appellants respectfully assert that neither Krishnamachari, Moghaddam or Kim teach, describe or suggest the embodiments of the present invention recited in Claim 1. As described above, neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including "obtaining a first two-dimensional image and a second two-dimensional image of an object," as claimed. Furthermore, Appellants respectfully assert that neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including "processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity," as claimed. Moreover, neither Krishnamachari nor Moghaddam teach, describe or suggest a method of measuring color consistency including "selecting a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions based upon a criteria related to a three-

dimensional region of the object," as claimed. As described above, Krishnamachari and Moghaddam teach image retrieval systems.

Moreover, the combination of Krishnamachari, Moghaddam and Kim fails to teach or suggest the claimed embodiments because Kim does not overcome the shortcomings of Krishnamachari and or Moghaddam. Appellants understand Kim to teach a method and for designating a local representative color value for color-based image searching. Kim, either alone or in combination with Krishnamachari and/or Moghaddam, does not show or suggest a method of measuring color consistency including "obtaining a first two-dimensional image and a second two-dimensional image of an object," "processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity," or "selecting a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions based upon a criteria related to a three-dimensional region of the object," as claimed.

Appellants respectfully assert that nowhere does the combination of Krishnamachari, Moghaddam and Kim teach, disclose or suggest the present invention as recited in independent Claim 1, and that Claim 1 is thus in condition for allowance. Therefore, Appellants respectfully submit that the combination of Krishnamachari, Moghaddam and Kim also does not teach or suggest the additional claimed features of the present invention as recited in Claim 17 that is dependent on allowable base Claim 1. Appellants respectfully submit that Claim 17 overcomes the rejection under 35 U.S.C. § 103(a) as this claim is dependent on an allowable base claim.

Conclusion

Appellants believe that pending Claims 1-3, 5-11 and 19 are patentable over Krishnamachari in view of Moghaddam. Appellants further believe that pending Claim 4 is patentable over Krishnamachari in view of Moghaddam, further in view of Kaufman. Appellants further believe that pending Claim 14 is patentable over Krishnamachari in view of Moghaddam, further in view of Swain. Appellants further believe that pending Claim 15 is patentable over Krishnamachari in view of Moghaddam, further in view of Syeda-Mahmood. Appellants further believe that pending Claim 17 is patentable over Krishnamachari in view of Moghaddam, further in view of Kim. As such, Appellants submit that Claims 1-11, 14, 15, 17 and 19 are non-obvious to a person of ordinary skill in the art and, therefore, are patentable over the prior art.

Appellants respectfully request that the rejection of Claims 1-11, 14, 15, 17 and 19 be reversed.

Respectfully submitted,
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VIII. Appendix - Clean Copy of Claims on Appeal

1. (Original) A method of measuring color consistency comprising:

obtaining a first two-dimensional image and a second two-dimensional image of an object;

subdividing the first image into a first set of image partitions and the second image into a second set of image partitions, each image partition having a color;

selecting a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions based upon a criteria related to a three-dimensional region of the object;

assigning each image partition in the first subset and each image partition in the second subset a color value corresponding to the color of the image partition;

placing each image partition in the first subset in one of a first series of histogram subdivisions and each image partition in the second subset in one of a second series of histogram subdivisions based on the color value of each image partition;

comparing the first series of histogram subdivisions to the second series of histogram subdivisions; and

processing the region based on whether the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity.

2. (Original) The method of claim 1, wherein the obtaining step comprises obtaining images of a scene as the object.

3. (Original) The method of claim 1, wherein the subdividing step comprises subdividing the first image into a first set of pixels and the second image into a second set of pixels.

4. (Original) The method of claim 1, wherein the selecting step comprises selecting the first subset and the second subset based upon a criteria related to a voxel region of the object.

5. (Original) The method of claim 1, wherein the selecting step comprises selecting the first subset and the second subset based upon whether the first subset and the second subset represent locations in the region.

6. (Original) The method of claim 1, wherein the assigning step comprises assigning an array value as the color value.

7. (Original) The method of claim 6, wherein the assigning step comprises assigning a three-dimensional array value as the array value.

8. (Original) The method of claim 7, wherein the assigning step comprises assigning a red-based color value, a green-based color value, and a blue-based color value to the three-dimensional array value.

9. (Original) The method of claim 8, wherein the assigning step comprises assigning a number between 0 and 255 to each of the red-based value, the green-based value, and the blue-based value.

10. (Original) The method of claim 9, wherein the assigning step further comprises combining a plurality of the red-based values, the green-based values, and the blue-based values into a smaller number of agglomerate values.

11. (Original) The method of claim 1, wherein the placing step further comprises combining portions of the first and second series of histogram subdivisions into a first and second series of histogram partitions.

12. (Original) The method of claim 11, wherein the combining step comprises combining the first and second series of histogram subdivisions into histogram partitions that at least partially overlap with adjacent partitions.

13. (Original) The method of claim 12, wherein the combining step comprises combining the first and second series of histogram subdivisions into histogram partitions that overlap with adjacent partitions by up to 20 percent.

14. (Original) The method of claim 1, wherein the comparing step comprises comparing a set of one histogram subdivision in the first series of histogram subdivisions and a corresponding subdivision in the second series of histogram subdivisions to see if each subdivision in the set contains an image partition.

15. (Original) The method of claim 1, wherein the obtaining step comprises choosing the object to include Lambertian surfaces.

16. (Original) The method of claim 1, further comprising:

obtaining a third two-dimensional image of the object;

subdividing the third image into a third set of image partitions;

selecting a third subset of image partitions in the third set of image partitions based upon the criteria related to a three-dimensional region of the object;

assigning each image partition in the third subset a color value corresponding to the color of the image partition;

placing each image partition in the third subset in one of a third series of histogram subdivisions based on the color value of each image partition;

comparing the third series of histogram subdivisions to the first series of histogram subdivisions and the second series of histogram subdivisions; and

determining what to do with the region based on whether each of the first, second, and third series of histogram subdivisions has at least one similarity with each of the other histogram subdivisions.

17. (Previously Presented) The method of claim 1, further comprising assigning a uniform region color to the entire region in a three-dimensional model.

18. (Previously Presented) The method of claim 1, further comprising deciding not to use the region in a three-dimensional model of the object if the number of image partitions in at least on of the first subset of image partitions and the second subset of image partitions is below a specified number.

19. (Original) A computer program product, comprising:

a computer-readable medium containing instructions for controlling a computer system to perform a method of measuring color consistency, the method comprising:

obtaining a first two-dimensional image and a second two-dimensional image of an object;

subdividing the first image into a first set of image partitions and the second image into a second set of image partitions, each image partition having a color;

selecting a first subset of image partitions in the first set of image partitions and a second subset of image partitions in the second set of image partitions based upon a criteria related to a three-dimensional region of the object;

placing each image partition in the first subset in one of a first series of histogram subdivisions and each image partition in the second subset in one of a second series of histogram subdivisions based on the color value of each image partition;

comparing the first series of histogram subdivisions to the second series of histogram subdivisions; and

including the region in a three-dimensional model of the object if the first series of histogram subdivisions and the second series of histogram subdivisions have a similarity.

20. (Original) The computer program product of claim 19, wherein the method further comprises:

obtaining a third two-dimensional image of the object;

subdividing the third image into a third set of image partitions;

selecting a third subset of image partitions in the third set of image partitions based upon the criteria related to a three-dimensional region of the object;

assigning each image partition in the third subset a color value corresponding to the color of the image partition;

placing each image partition in the third subset in one of a third series of histogram subdivisions based on the color value of each image partition;

comparing the third series of histogram subdivisions to the first series of histogram subdivisions and the second series of histogram subdivisions; and

determining what to do with the region based on whether each if the first, second, and third series of histogram subdivisions has at least one similarity with each of the other histogram subdivisions.

IX. Evidence Appendix

No evidence is herein appended.

X. Related Proceedings Appendix

No related proceedings.